

-6-

(MSC/VLR) 320 serving a location area (LA) 305 where the MS 300 is located. However, with reference now to FIGURE 3A of the drawings, in accordance with a first preferred embodiment of the present invention, when the MS 300 has an active call connection to a server or router running Internet Protocol (IP), e.g., a Direct Access Unit (DAU) 330 within the MSC/VLR 320 or to an Internet Service Provider (ISP) 335 (as illustrated in FIGURE 3B of the drawings) through Point-to-Point (PPP) or Serial Line Internet Protocol (SLIP) over a link layer protocol, such as HDLC or other modem protocol, in order for the MS 300 to receive incoming Public Switched Telephone Network (PSTN) 350 calls, the subscriber must have a subscription to a call forwarding to voice gateway feature 325. This enables the incoming PSTN 350 call to be forwarded to a voice gateway 340 within the serving MSC/VLR 320. The voice gateway 340 then transforms the call to an Internet phone call using Internet Protocol. Thus, from the called party's 300 (mobile subscriber's view), the incoming call through the MS 300 to, for example, a laptop computer 302, will have the appearance of an Internet phone call coming from the Internet 390.

When the MS 300 enters the LA 305 associated with the serving MSC/VLR 320, the MS 300 performs a location update to the serving MSC/VLR 320. The serving MSC/VLR 320 then informs a Home Location Register (HLR) 370 associated with the MS 300 of the new location of the MS 300 and obtains subscriber data, including parameters of the call forwarding to voice gateway feature 325, associated with the MS 300 from the HLR 370. Thereafter, when the MS 300 requests a call connection to the DAU 330 or to an ISP 335, e.g., by sending a SETUP message to the serving MSC/VLR 320, the serving MSC/VLR 320 checks the subscriber data associated with the MS 300 to determine if the subscriber has purchased the call forwarding to voice gateway feature 325. If the subscriber has purchased the call forwarding to voice gateway feature 325, the voice gateway feature 325 is activated.

Thereafter, when a PSTN 350 call enters the serving MSC/VLR 320, the PSTN 350 call is forwarded to the voice gateway 340, where the call is transformed into an Internet call. The IP packets related to the Internet call are then routed to the MS 300 via the DAU 330 within the MSC/VLR 320 and a Base Station System (BSS) 310 connected to the MSC/VLR 320. Alternatively, as shown in FIGURE 3B of the

-7-

drawings, if the MS 300 has a call connection to an ISP 335, the PSTN 350 call is routed to the MS 300 from the voice gateway 340 via the ISP 335 and the BSS 310.

5 However, if the subscriber has not purchased the call forwarding to voice gateway feature 325 or the subscriber rejects the call, e.g., does not answer the call, the call can be redirected to the subscriber's voice mail system 380 or the calling party can receive a busy signal.

10 In a second embodiment, during the MS 300 originated connection establishment of a direct access to the Internet 390, the MS 300 can signal specific information, such as a prefix, to activate the call forwarding to voice gateway feature 325. For example, the subscriber could enter a service code, e.g., *99, on a keypad 308 of the MS 300, which is sent to the serving MSC/VLR 320 in the originating SETUP message or as a service code in an Unstructured Supplementary Service Data (USSD) message. Once the MSC/VLR 320 receives the service code, the MSC/VLR 320 can then optionally check the subscriber data associated with the MS 300 to
15 determine if the subscriber has purchased the call forwarding to voice gateway feature 325. If so, the MSC/VLR 320 activates the call forwarding to voice gateway feature 325. Thereafter, when a PSTN 350 call to the MS 300 enters the serving MSC/VLR 320, the call can then be forwarded to the voice gateway 340 and completed to the MS 300 via the DAU 330 and the BSS 310 or the ISP 335 and the BSS 310, as described
20 hereinabove.

However, if the MS 300 has not purchased the call forwarding to voice gateway feature 325, or if the subscriber has deactivated the feature 325, e.g., by entering another service code, the call can be forwarded to the subscriber's voice mail system 380 or the calling party can receive a busy signal.

25 In addition, for either of the above listed embodiments, if the PSTN 350 call can be completed to the MS 300, there will be some requirements on the bandwidth across the air interface. For example, two time slots, provided by High Speed Circuit Switched Data (HSCSD), will typically be required because most Internet phone applications require at least a 14.4 modem. However, one time slot may be enough
30 with 14.4 channel coding, and future voice codecs may even provide a reasonable voice quality on 9.6 kbps. The bandwidth requirements need to be checked by the

-8-

MSC/VLR 320, and if the requirements can not be met, the call can be forwarded to the subscriber's voice mail 380 or the calling party can receive a busy signal.

5 As will be recognized by those skilled in the art, the innovative concepts described in the present application can be modified and varied over a wide range of applications. Accordingly, the scope of patented subject matter should not be limited to any of the specific exemplary teachings discussed.

-9-

WHAT IS CLAIMED IS:

1. A telecommunications system for connecting a voice call to a mobile terminal in wireless communication with a mobile switching center when said mobile terminal is connected to the Internet, said telecommunications system comprising:

5 a voice gateway within said mobile switching center, said voice call being forwarded to said voice gateway when said mobile terminal has a call forward feature associated therewith, said voice gateway transforming said voice call into an Internet call; and

10 an Internet router connected to said mobile switching center and the Internet, said Internet call being connected from said voice gateway to said mobile terminal via said Internet router.

15 2. The telecommunications system of Claim 1, wherein said Internet call is connected between said mobile terminal and a calling subscriber within the Public Switched Telephone Network.

20 3. The telecommunications system of Claim 2, wherein said calling subscriber receives a busy signal when said mobile terminal does not have said call forward feature associated therewith.

25 4. The telecommunications system of Claim 1, wherein said voice call is forwarded to said voice gateway when said mobile terminal sends a service code to said mobile switching center, said service code activating said call forward feature.

30 5. The telecommunications system of Claim 1, wherein parameters associated with said call forward feature are obtained by a visitor location register connected to said mobile switching center from a home location register connected to said visitor location register when said mobile terminal enters a location area served by said mobile switching center, said call forward feature being activated when said

-10-

mobile terminal connects to the Internet.

6. The telecommunications system of Claim 1, wherein said Internet router is a direct access unit within said mobile switching center.

5

7. The telecommunications system of Claim 6, wherein said Internet call is connected to said mobile terminal from said voice gateway via said direct access unit and a base station system connected to said mobile switching center.

10 8. The telecommunications system of Claim 1, wherein said Internet router is an Internet Service Provider connected to said mobile switching center.

15 9. The telecommunications system of Claim 8, wherein said Internet call is connected to said mobile terminal from said voice gateway via said Internet Service Provider and a base station system connected to said mobile switching center.

20 10. The telecommunications system of Claim 1, wherein said voice call is connected, by said mobile switching center, to a voice mail system associated with said mobile terminal when said mobile terminal does not have said call forward feature associated therewith.

25 11. The telecommunications system of Claim 1, wherein said voice call is connected, by said mobile switching center, to a voice mail system associated with said mobile terminal when bandwidth requirements associated with said Internet call cannot be met by said mobile switching center.

30 12. The telecommunications system of Claim 1, wherein said voice call is connected, by said mobile switching center, to a voice mail system associated with said mobile terminal when said mobile terminal rejects said Internet call.

-11-

13. A method for connecting a voice call to a mobile terminal in wireless communication with a mobile switching center when said mobile terminal is connected to the Internet, said method comprising the steps of:

5 activating, by said mobile switching center, a call forward feature associated with said mobile terminal, when said mobile terminal connects to the Internet;
forwarding, by said mobile switching center, said voice call to a voice gateway within said mobile switching center;
transforming, by said voice gateway, said voice call into an Internet call; and
10 connecting said Internet call from said voice gateway to said mobile terminal via an Internet router connected to said mobile switching center and the Internet.

14. The method of Claim 13, wherein said Internet call is connected between said mobile terminal and a calling subscriber within the Public Switched Telephone Network.
15

15. The method of Claim 14, further comprising, before said step of forwarding, the step of:
receiving, by said calling subscriber, a busy signal when said mobile terminal
20 does not have said call forward feature associated therewith.

16. The method of Claim 13, wherein said step of activating is performed when said mobile terminal sends a service code to said mobile switching center, said service code activating said call forward feature.
25

17. The method of Claim 13, further comprising, before said step of activating, the step of:
obtaining, by a visitor location register connected to said mobile switching
30 center, parameters associated with said call forward feature from a home location register connected to said visitor location register when said mobile terminal enters a

-12-

location area served by said mobile switching center.

18. The method of Claim 13, wherein said Internet router is a direct access unit within said mobile switching center.

5

19. The method of Claim 18, wherein said step of connecting said Internet call to said mobile terminal is performed from said voice gateway via said direct access unit and a base station system connected to said mobile switching center.

10

20. The method of Claim 13, wherein said Internet router is an Internet Service Provider connected to said mobile switching center.

15

21. The method of Claim 20, wherein said step of connecting said Internet call to said mobile terminal is performed from said voice gateway via said Internet Service Provider and a base station system connected to said mobile switching center.

22. The method of Claim 13, further comprising, before said step of activating, the step of:

20

connecting, by said mobile switching center, said voice call to a voice mail system associated with said mobile terminal when said mobile terminal does not have said call forward feature associated therewith.

23. The method of Claim 13, further comprising, before said step of forwarding, the step of:

25

connecting, by said mobile switching center, said voice call to a voice mail system associated with said mobile terminal when bandwidth requirements associated with said Internet call cannot be met by said mobile switching center.

24. The method of Claim 13, further comprising, after said step of transforming, the step of:

30

connecting, by said mobile switching center, said voice call to a voice mail

WO 99/34587

PCT/US98/27432

-13-

system associated with said mobile terminal when said mobile terminal rejects said Internet call.

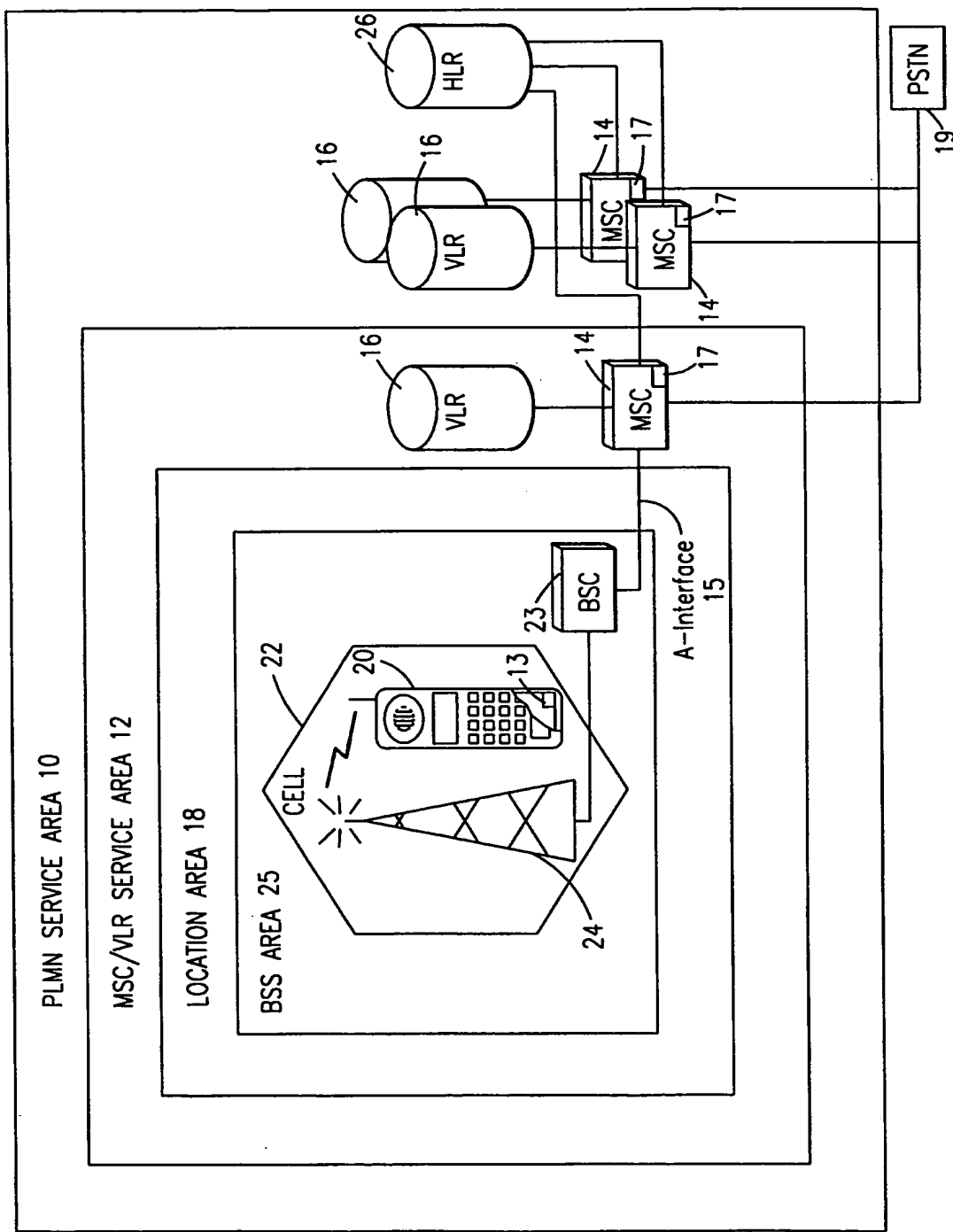


FIG. 1

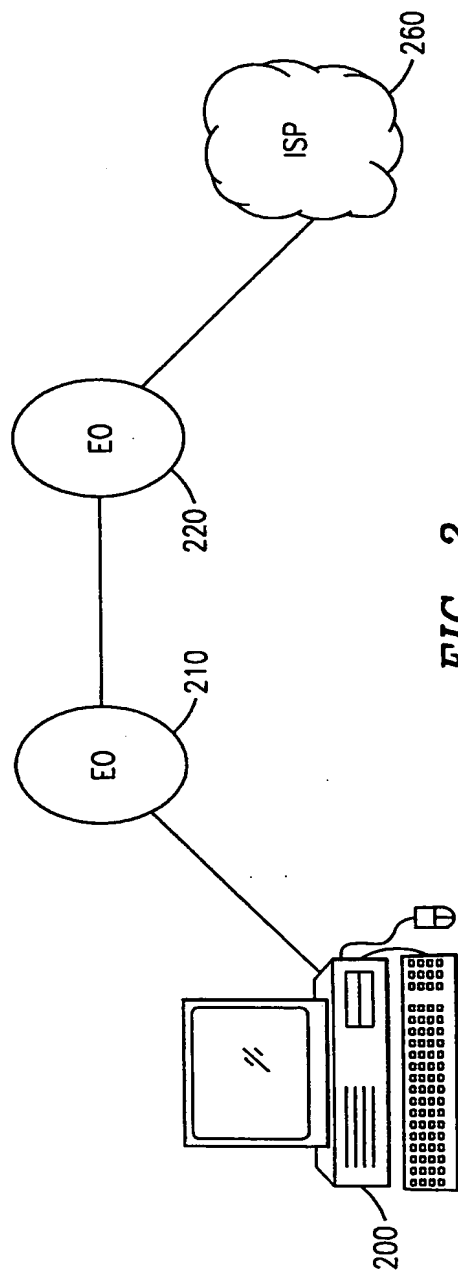


FIG. 2

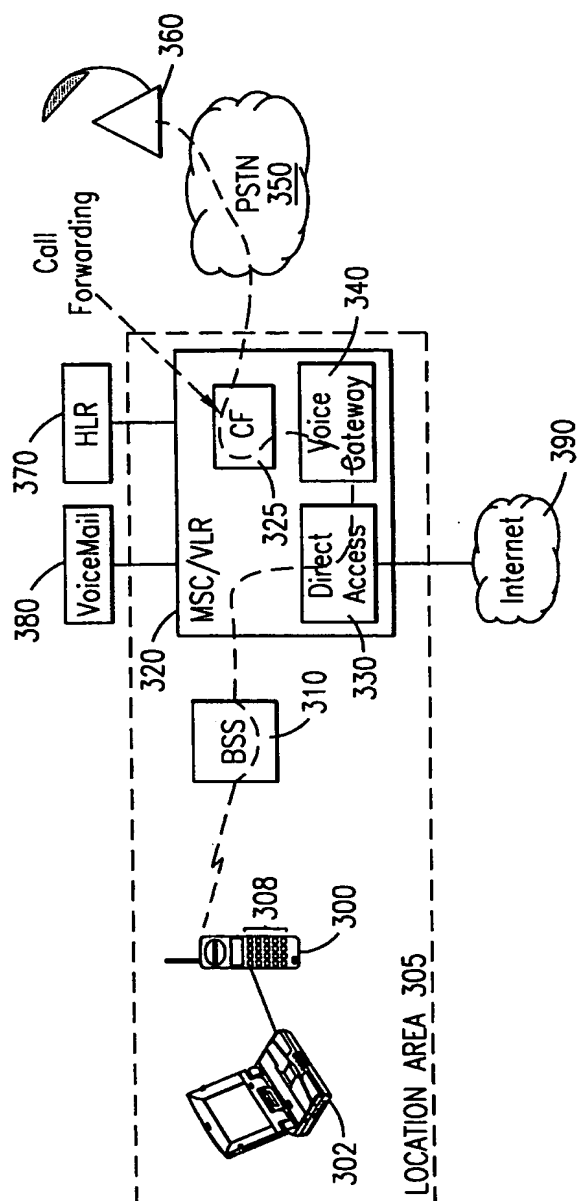


FIG. 3A

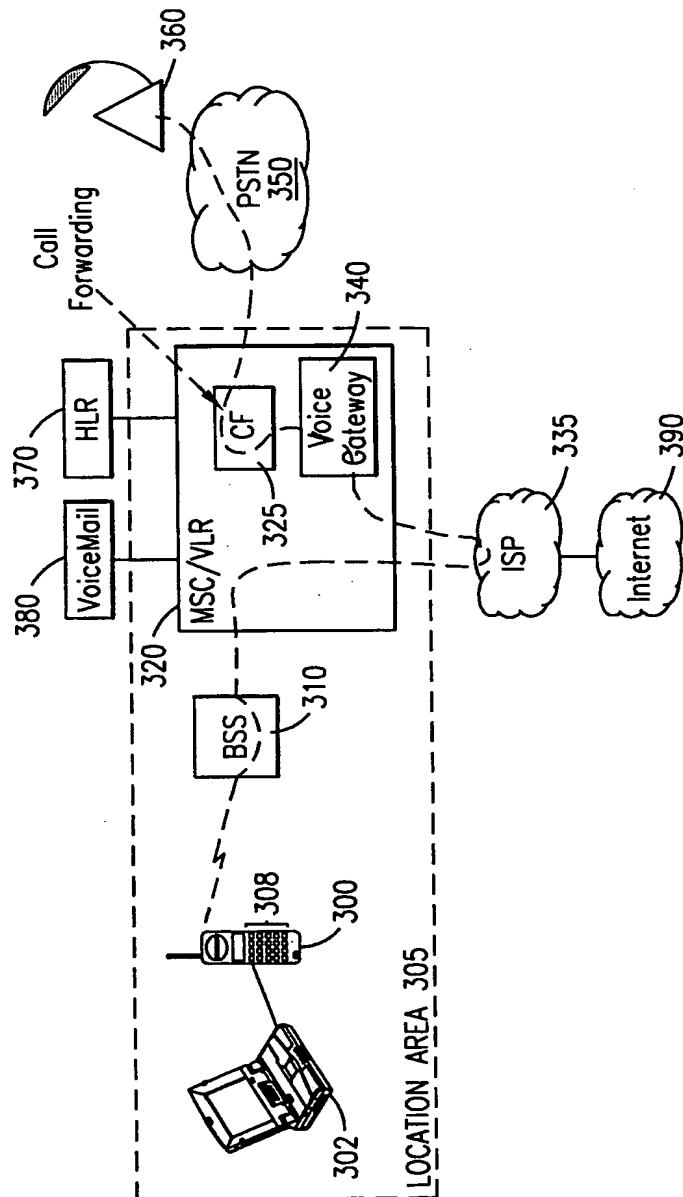


FIG. 3B

INTERNATIONAL SEARCH REPORT

Inter. Appl. No.
PCT/US 98/27432

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04M7/00 H04Q7/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04M H04Q H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 97 26749 A (INTERACTIVE TELECOM INC) 24 July 1997 see page 11, line 20 - page 14, line 27 see page 15, line 21 - page 18, line 19 see page 19, line 21 - page 21, line 12 ---	1-24
A	RABBAGE R ET AL: "INTERNET PHONE- CHANGING THE TELEPHONY PARADIGM?" BT TECHNOLOGY JOURNAL, vol. 15, no. 2, April 1997, pages 145-157, XP000676853 see paragraph 4 ---	1-24
A	EP 0 766 490 A (NOKIA MOBILE PHONES LTD) 2 April 1997 see the whole document -----	1-24

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

1 April 1999

Date of mailing of the international search report

12/04/1999

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Weinmiller, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter. Application No

PCT/US 98/27432

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9726749 A	24-07-1997	CA 2167215 A US 5809128 A AU 1362397 A CA 2218231 A EP 0875110 A	16-07-1997 15-09-1998 11-08-1997 24-07-1997 04-11-1998
EP 0766490 A	02-04-1997	FI 954639 A JP 9130405 A	30-03-1997 16-05-1997

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.